

Hepatitis: The silent epidemic

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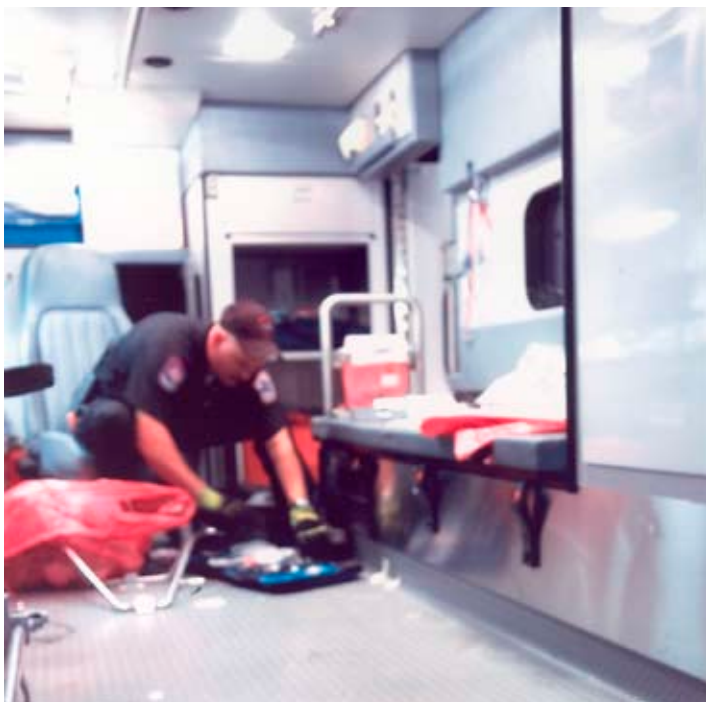


Photo by Joe Duty

Scenario

“Medic 2, S1: respond 2346 FM 1872 for a respiratory.” You and your partner quickly head out the door, knowing that it is never a good sign when dispatch automatically pages the supervisor to your call. You are en route only seconds before the supervisor updates her location: estimated six minutes response time to the scene. The dispatcher responds, “Medic 2, S1 en route, 0722, stand by for further information.” As you help your partner negotiate the early morning traffic, you wait for dispatch to finish giving instructions to the calling party and then update you on the situation. Moments later, the radio and pagers simultaneously go off. “Medic 2, S1, you’re responding to an unconscious 36-year-old male, 31 Delta 2. Police and fire department have been dispatched.”

Several minutes later you arrive in one of the less desirable parts of your district. Your partner carefully negotiates the large

pot holes in the road as you try to locate numbers on the run-down houses and falling mailboxes. You see a woman in the front yard of an old house waving her arms at you. You and your partner grab jump bags and monitors and head across the yard to where the woman is pointing at a man lying on the front porch.

The call proceeds without incident. You transport the patient, who has overdosed, to your local emergency department and go back in service. Nothing seems unusual until you receive a phone call from the shift supervisor. The supervisor tells you that according to the emergency department, this morning’s patient had an incredibly high count of hepatitis C virus. As a result, you must thoroughly decontaminate your unit. You report the message to your partner, saying, “It’s good that we were all really cautious and took BSI precautions, but we want to make sure that we didn’t miss anything so we don’t pass this to another patient.”

Hepatitis

Hepatitis literally means inflammation of the liver. Many toxins, such as drugs and alcohol, can result in inflammation. Strains of the hepatitis virus are not the only viruses that can cause the liver to become inflamed. Viruses such as mononucleosis and cytomegalovirus attack other organs as well as the liver, resulting in inflammation and hepatic insufficiency. The hepatitis virus, however, remains the leading cause of hepatic dysfunction. At least six different hepatitis viruses have been identified. Types A and E are food-borne and do not usually cause long-term health problems. Types B and C spread primarily through blood contact. Types D, F (unconfirmed) and G are rare in the United States and will not be covered in this article.

Patients with type B or type C hepatitis can develop lifelong conditions in which their immune systems never rid the liver of the virus. Chronic hepatitis is diagnosed when the hepatitis virus lasts longer than six months. In both types B and C, the virus can live and multiply in the liver for years or decades. Over time, the chronic inflammation results in extensive liver scarring, failure and often hepatic cancer. Just as with other acute viral infections, the patient is able to transmit the virus to others. Because many patients with hepatitis B or C are unaware they have the virus until they have significant liver damage, the condition has become a silent epidemic.

Pathophysiology of the liver

A healthy liver weighs about three pounds, making it the largest internal organ in the human body. It is largely protected by the right side of the rib cage. Primary functions of the liver include metabolizing carbohydrates, lipids and proteins; storing vitamins and glycogen, filtering toxins from the blood; and secreting bile.

The liver metabolizes carbohydrates into glycogen, which is stored in the hepatocytes for instant access to energy. Cells that respond to hormones such as insulin and glucagon lower the blood



glucose level by converting glucose to glycogen. These same cells also help raise the blood glucose levels by breaking down glycogen and converting it to glucose,

Hepatitis Symptoms

Although it is not unusual for virally infected patients to be asymptomatic, the following symptoms can indicate hepatic distress.

Fever	Fatigue	Dark urine
Clay-colored stool	Abdominal pain	Loss of appetite
Nausea	Vomiting	Joint pain
Jaundice		

Comparison of types of hepatitis virus with source and transmission

	Source	Chronic	Prevention	Transmission
Hepatitis A	Feces	No	Vaccine	Fecal/oral
Hepatitis B	Blood/body fluids	Yes, 10%	Vaccine	Contact with blood, body fluids or contaminated surfaces
Hepatitis C	Blood/body fluids	Yes, 85%	No vaccine	Contact with blood or body fluids

which can be used as instant energy. The liver also converts proteins into urea and plasma proteins. It produces proteins such as albumin, which maintains the osmotic pressure of blood; fibrinogen and prothrombin, which are necessary for blood clotting; and globulin, which is used in the immune processes.

When working properly, the liver purifies the blood by breaking down harmful chemicals into smaller components that can then be eliminated from the body. It filters out damaged red blood cells and toxic substances, such as alcohol.

The liver can produce as much as a liter of bile per day, which is necessary to process the intake of fat. The bile is stored in the gallbladder, where the excess fluid is removed and bile salts are formed. In normal circumstances, the blood transports fats synthesized in the liver to adipose tissue for storage. The failure of this process may, in part, explain why weight loss is often a symptom reported by patients with hepatic diseases.

Hepatitis A virus

The hepatitis A virus (HAV) is the most common cause of viral hepatitis, responsible for up to 40 percent of cases worldwide. Formerly known as infectious

hepatitis, it is enteric, or transmitted through food and water contamination. Hepatitis A has an incubation period that averages 30 days (15 to 45), and 99 percent of infected patients will recover without medical intervention. Although



both hepatitis A and E will result in significant illness, including nausea, vomiting, and general malaise, infection from one or the other will result in immunity to further infection from that type. Long-term medical problems are not typically a concern, but the lengthy incubation period can make pinpointing the origin of transmission difficult. The patient may have had close personal contact with another infected person or eaten contaminated food prepared by infected food handlers. Both hepatitis A and E are transmitted by the fecal-oral route, and if hand washing and sanitary precautions are not strictly observed,

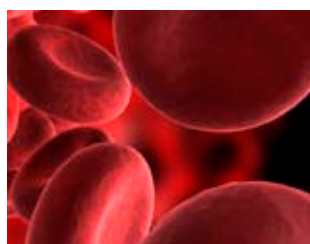
Hepatitis virus communication patterns

	New cases per year in U.S.	Chronic cases, U.S.	Chronic cases, worldwide	Percent of infections that become chronic	Incubation period
Hepatitis A	150,000	0	0	0	15–45 days
Hepatitis B	200,000	1.25 million	>350 million	>10%	45–160 days
Hepatitis C	150,000	4 million	>170 million	50–85%	14 days–6 months

HAV can spread through food service or day care facilities. Because it is common in areas where water and sewage treatment are inconsistent, international travel, especially to Third World countries, can also increase a person's risk of acquiring hepatitis A.

Hepatitis B virus

Infection from the hepatitis B virus (HBV), also known as serum hepatitis, is highly contagious and is spread by blood products or body fluids. The virus often culminates in liver failure and is associated with liver cancer. Five out of 100 infected people will develop chronic infections because they are unable to completely rid the liver of HBV. This chronic infection often leads to liver damage. According to the World Health Organization, currently



more than 300 million people are chronically infected with hepatitis B. Worldwide mortality from

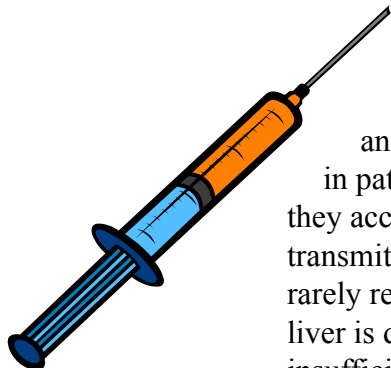
chronic infection is approximately 1 million annually, despite the availability of a vaccine. HBV is transmitted through parenteral methods, meaning through

blood, mucus or other body fluids. Treating chronic hepatitis B focuses on suppressing HBV replication and preventing cirrhosis, liver failure and hepatocellular carcinoma. Current therapy for chronic HBV infection does not eradicate the virus, it only suppresses the viral replication in the liver.

The sheer tenacity and stability of HBV is a particular concern for EMS providers. When compared to other viruses, such as HIV, hepatitis B is relatively stable in environments outside the body, and it can remain viable for a minimum of seven days at room temperature. Because it can live on environmental surfaces for such a long duration, it is particularly important for providers to thoroughly clean all surfaces within the ambulance after each and every call—even something small, like a pen, can harbor the virus. Surfaces that are not routinely cleaned and disinfected potentially allow HBV transmission to another patient. In one study by the CDC, the hepatitis B antigen was found on clamps, scissors, dialysis machine control knobs and doorknobs. Some patients will circulate very high levels of HVB. In those cases, the virus can be present on environmental surfaces in the absence of any visible blood for an unknown period of time and can result in disease transmission.



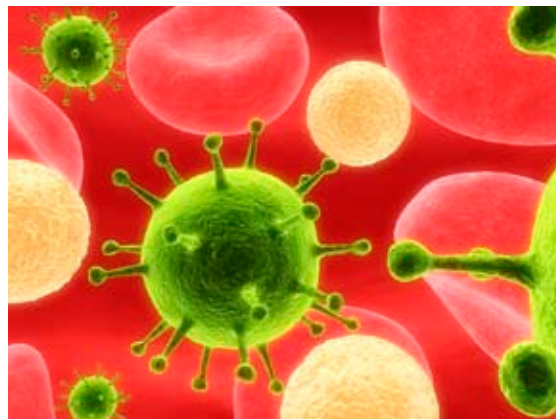
Hepatitis C virus



An estimated four million Americans are chronically infected with hepatitis C (HCV). This strain, also transmitted mainly through blood and fluid contact, is most often found in patients using intravenous drugs; they account for 60 percent of newly transmitted cases. This form of hepatitis rarely results in symptoms until after the liver is damaged enough to cause hepatic insufficiency. Most individuals do not have any symptoms from the infection and are completely unaware that they are carriers or chronically infected. Within the population of IV drug users in the United States, the infection rate is estimated to be as high as 80 percent. Thus, HCV is a serious medical consequence of drug abuse that must be considered when providing care to known drug abusers and patients who have overdosed. Other high risk factors include risky sexual behaviors, cocaine use, hemodialysis, occupational exposure, tattoos and body piercings. It is further estimated that approximately 25 to 30 percent of individuals infected with HIV are also infected with HCV, making this form of hepatitis particularly difficult for long-term management of HIV.

Of the patients who become infected with HCV, as many as 85 percent will develop a chronic infection. The inability to recognize and diagnose HCV in the early stages, due to the lack of symptoms, allows the virus to gain a particularly strong foothold in the body. As a result, most patients will become chronic carriers before they even realize that they have been initially infected. According to the New England Journal of Medicine, the current hepatitis C epidemic in the United States is causing a dramatic rise in liver infections, including a 71 percent increase

in hepatocellular carcinoma. Hepatitis C is the number one reason for liver transplants performed in the United States annually and, although the diseased liver is replaced, the transplant procedure does not eradicate the virus. Liver transplant recipients often continue to harbor the HCV virus, and the new liver soon succumbs to HCV. The rapid replication and high mutation rate of HCV and medicine's inability to combat it accounts for the persistence of the infection. Further, the lack of understanding of the mechanism responsible for liver injury in type C results in a particularly high mortality rate. Mortality is ultimately the result of



progressive hepatic fibrosis, cirrhosis and hepatocarcinoma.

Hepatitis C is the most common bloodborne infection according to the CDC, and the single major cause of chronic liver disease. After years of declining rates of new hepatitis C infections, the CDC reported in 2008 a 19 percent increase in confirmed new cases. The peak age of new cases was 40 to 49 years old. The highest prevalence rates of HCV infection continue to be in males. Due in part to the incredibly high rate at which this virus becomes chronic, this silent but deadly strain of hepatitis ranks 11th in prevalence worldwide. HCV is the 10th leading cause of death in the United States.

Treatment

Patients with hepatitis B and C frequently present with symptoms directly proportional to their hepatic insufficiency. Although most patients will be asymptomatic related to the viral infection, signs and symptoms of liver inflammation may include nausea, vomiting, malaise, photophobia, pharyngitis and coughing. Depending on the level of the patient's hepatic condition, the patient will generally present an unhealthy impression. Jaundice may or may not be present; it occurs in 65 to 70 percent of cases. Skin temperature may be misleading—the patient may have a fever and be warm, or he may have cool, pale skin as a reaction to internal bleeding from a ruptured lesion. The patient may have upper right abdominal quadrant pain that radiates into the right shoulder, although this is not definitive.

Prehospital treatment will be primarily palliative and targeted to the patient's specific signs and symptoms. Secure airway, breathing and circulation and allow the patient to remain in a comfortable position if spinal precautions are not indicated. Because the liver is responsible for the metabolism of many drugs, be especially cautious when administering medications. Check the patient's blood sugar level, as the liver is responsible for glycogen storage and supply. Consider fluid administration when indicated. Ondansetron, often used for nausea, is metabolized by hepatic cytochrome P-450 drug-metabolizing enzymes and should be used with caution. Likewise, acetaminophen, which normally would be considered for treating fever, should be used with extreme caution.

Health care, emergency medical and public safety workers should understand the risk for and prevention of bloodborne infections and should be vaccinated



against hepatitis B. Standard or universal precautions must include the use of gloves when touching blood, body fluids, secretions, excretions or contaminated items of all patients. In fact, all providers are strongly urged to wear gloves, not only during patient contact, but whenever handling patient equipment or cleaning and disinfecting the unit. As infectious diseases become more prevalent and drug resistant, it is in every provider's best interest to renew his or her commitment to personal protection against disease transmission.

Hemodialysis patients

When transporting and treating patients, EMS providers should be aware of specific CDC recommendations aimed at hemodialysis centers and should maintain strict adherence. The CDC requires glove use whenever patients or hemodialysis equipment is touched and it is strongly recommended that EMS providers who regularly transport this type of patient establish written policies related to infection control. The policy should include steps for cleaning and disinfecting nondisposable items before use on another patient, use of gloves whenever patient or patient equipment is touched and routine cleaning and disinfection of equipment and environmental surfaces. When implemented in hemodialysis centers, these specific changes resulted in a 70 to 80 percent reduction in new incidence of HBV infection.

Conclusion

The understanding of hepatitis B infection and availability of treatment options is rapidly evolving. Although HBV can be prevented with effective vaccination, many individuals are currently infected and are at risk of developing liver disease and hepatocellular carcinoma. The climbing rates of new cases of HCV should provide a wake-up call for EMS providers, especially those who frequently transport patients in high risk categories such as hemodialysis and drug abuse. The tenacity of this virus for survival can leave your unit contaminated without the presence of visible blood for weeks and possibly months after the infected patient has been transported. The incredibly high rate at which HCV becomes chronic, and the associated morbidity, should be a concern for all health care providers.

Recently, the CDC released its latest study (January 2009), which cites 33 outbreaks and 450 new cases of HBV and HCV as the result of health care personnel failing to follow basic infection control procedures. The outbreak points of transmission, all within the last decade, have been found to be the outside of the hospital environment. As professional health care providers, we must continue to be diligent in protecting each and every patient we serve and should recommit ourselves to quality infection control practices.

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